AMENDMENTS TO THE SPECIFICATION:

Page 1, please add the following new paragraphs before paragraph [0001]:

[0000.2] CROSS-REFERENCE TO RELATED APPLICATIONS

[0000.4] This application is a 35 USC 371 application of PCT/DE 2004/000848 filed on April 23, 2004.

[0000.6] BACKGROUND OF THE INVENTION

Please replace paragraph [0001] with the following amended paragraph:

[0001] ~~Prior Art~~ **Field of the Invention**

Please replace paragraph [0002] with the following amended paragraph:

[0002] The present invention relates to an **improved** injection nozzle for internal combustion engine ~~with the characteristics of the preamble to claim 1~~.

Please add the following new paragraph after paragraph [0002]:

[0002.4] Description of the Prior Art

Please replace paragraph [0003] with the following amended paragraph:

[0003] An injection nozzle of ~~this kind~~ **of the type with which this invention is concerned** is known, for example, from DE 100 60 836 C1 and has a nozzle body provided with at least one injection opening. The nozzle body also contains a needle guide in which a nozzle needle is guided. The nozzle needle is able to control the injection of fuel through the at least one injection opening. In the known injection nozzle, a supply line that supplies highly pressurized fuel to the at least one injection opening contains a control valve that is able to control the fuel supply through the supply line to the at least one injection opening. An actuator is drive-coupled to this control valve to actuate it. At its end oriented away from the

at least one injection opening, the nozzle needle has a control piston that is guided in a control chamber so that it is able to execute a stroke motion. On the one hand, this control chamber communicates with the supply line that the control valve is able to control. On the other hand, a suitably throttled outlet line leads away from the control chamber to a leakage chamber and contains a slide valve that is able to control this outlet line. This slide valve is thus a component of the control valve and the actuator consequently actuates it together with the control valve. At its end oriented toward the at least one injection opening, the nozzle needle has a pressure shoulder that acts on the nozzle needle in the opening direction when subjected to pressure.

Page 2, please replace paragraph [0007] with the following amended paragraph:

[0007] ~~Advantages of the Invention~~

SUMMARY AND ADVANTAGES OF THE INVENTION

Please replace paragraph [0008] with the following amended paragraph:

[0008] The injection nozzle according to the present invention[[,]] ~~with the characteristics of the independent claim,~~ has the advantage over the prior art that it is possible to control the nozzle needle directly through the actuation of the control piston. This is possible in that both a compensator surface of the nozzle needle and a control surface of the control piston are subjected to the high fuel pressure; the control surface and the compensator surface are coupled to each other via a corresponding hydraulic path. This means that a change in the pressure acting on the control surface, which is brought about by a triggering of the actuator, i.e. the control piston, also has a direct effect on the compensator surface of the nozzle needle,

which directly changes the equilibrium of forces acting on the nozzle needle in order to open or close the nozzle needle. The cost for implementing this kind of direct nozzle needle control is considerably reduced.

Page 4, please delete paragraph [0013].

Please replace paragraph [0014] with the following amended paragraph:

[0014] ~~Drawings~~ **BRIEF DESCRIPTION OF THE DRAWINGS**

Please replace paragraph [0015] with the following amended paragraph:

[0015] Exemplary embodiments of the injection nozzle according to the present invention are ~~shown in the drawings and will be~~ explained in greater detail below[[;]] **in conjunction with the drawings, in which:** components that are the same or similar or that function in the same manner are labeled with the same reference numerals**, and in which:** [[.]]

Page 5, please replace paragraph [0016] with the following amended paragraph:

[0016] ~~Figs. 1 through 5 show~~ **Fig. 1 shows a** very simplified schematic longitudinal ~~sections~~ **section** through ~~various~~ **one** embodiment ~~forms~~ of an injection nozzle according to the present invention**, and** [[.]]

Please add the following new paragraph after paragraph [0016]:

[0016.5] Figs. 2 through 5 are views similar to Fig. 1 showing further embodiments.

Please replace paragraph [0017] with the following amended paragraph:

[0017] ~~Description of the Exemplary Embodiments~~

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Page 6, please replace paragraph [0020] with the following amended paragraph:

[0020] It is possible to connect the nozzle chamber 10 to the at least one injection opening 3 via an annular chamber 11, the sealing seat 8 being positioned between the annular chamber 11 and the at least one injection opening 3. Inside the nozzle chamber 10 and the annular chamber 11, the nozzle needle 5 has a pressure shoulder 12 that is oriented toward the at least one injection opening 3. The area of the pressure shoulder 12 is calculated by subtracting a sealing surface 14 in the sealing seat 8 from a guide surface 13 in the cross-section of the needle guide 6. During operation of the injection nozzle 1, the high fuel pressure acts on the pressure shoulder 12 continuously so that the nozzle needle 5 is loaded with an opening force acting in its opening direction ~~15, which is~~ symbolized by [[an]] **the** arrow **15**.

Please replace paragraph [0021] with the following amended paragraph:

[0021] The nozzle needle 5 is associated with a first compensator surface 16 that serves to impart compressive forces to the nozzle needle 5. In the embodiment form depicted in Fig. 1, the first compensator surface 16 is embodied on the nozzle needle 5 itself, at an end oriented away from the at least one injection opening 3. Correspondingly, when subjected to pressure, the first compensator surface 16 acts on the nozzle needle 5 in a closing direction ~~17, which is~~ symbolized by [[an]] **the** arrow **17**. In this instance, the compensator surface 16 is larger than the pressure shoulder 12 so that in order to close the nozzle needle 5 or keep it closed, it is sufficient to subject the first compensator surface 16 to the high fuel pressure.

Page 9, please replace paragraph [0029] with the following amended paragraph:

[0029] In an initial state depicted in Fig. 1, the actuator 19 is not triggered; the control piston 18 is therefore stationary. The supply line 9 is subjected to the high fuel pressure so that this high fuel pressure is also present in the nozzle chamber 10, the annular chamber 11, and the second control chamber 28. In the static state, the second hydraulic path 29 is able to achieve a pressure compensation between the control chambers 23 and 28 so that the high fuel pressure correspondingly is also present in the first control chamber 23. The high fuel pressure consequently is also present in the first compensator chamber 24 via the first hydraulic path 22. On the one hand, the high fuel pressure cooperates with the first compensator surface 16 to act on the nozzle needle 5 in the closing direction 17. On the other hand, the high fuel pressure in the nozzle chamber 10 and in the annular chamber 11 cooperates with the pressure shoulder 12 to act in the opening direction 15. Since the first compensator surface 16 is larger than the pressure shoulder 12, this yields a net resulting force acting on the nozzle needle 5 in the ~~opening~~ **closing** direction 17. The return spring 26 also acts on the nozzle needle 5 in the closing direction 17. This correspondingly presses the needle tip 17 of the nozzle needle 15 against the sealing seat 8. The nozzle needle 5 is thus closed and disconnects the at least one injection opening 3 from the annular chamber 11 and from the fuel supply line 9.

Please replace paragraph [0030] with the following amended paragraph:

[0030] In order to trigger a fuel injection through the at least one injection opening 3 into the combustion chamber 4, the actuator 19 is triggered so that it drives the control piston 18 to execute an opening stroke ~~31, which is~~ symbolized by [[an]] **the** arrow **31**. On the one hand,

the opening stroke 31, which is executed at a relatively high adjusting speed, reduces the volume of the second control chamber 28. The fuel thus displaced is able to escape into the supply line 9. On the other hand, the opening stroke 31 increases the volume of the first control chamber 23. Since the second hydraulic path 29 is unable to achieve a pressure compensation between the control chambers 23 and 28 during dynamic events, or is only able to do so in a delayed fashion, a pressure decrease therefore occurs in the first control chamber 23. This pressure decrease is transmitted directly into the first compensator chamber 24 via the first hydraulic path 22 so that only a reduced pressure acts on the first compensator surface 16. The opening stroke 31 here is selected so that the decrease in the pressure acting on the first compensator surface 16 changes the balance of forces acting on the nozzle needle 5, yielding a resulting force that then acts in the opening direction 15. This means that the high fuel pressure still acting on the pressure shoulder 12 of the nozzle needle 5 predominates. Correspondingly, the nozzle needle 5 lifts away from the seat 8, i.e. the nozzle needle 5 opens. Consequently, fuel is then able to flow at high pressure to the at least one injection opening 3 and is injected through it into the combustion chamber 4.

Page 11, please replace paragraph [0032] with the following amended paragraph:

[0032] The injection nozzle 1 according to Fig. 1 features a particularly simple design that also permits a direct triggering of the nozzle needle 5 via the control piston [[8]] **18**. It is important here that the high fuel pressure acts on the pressure shoulder 12 even when the nozzle needle 5 is closed. Another advantage to this embodiment form is that when subjected to pressure, the first compensator surface 16 acts in the closing direction 17 so that the only

thing required to open the nozzle needle 5 is a decrease in the pressure acting on the first compensator surface 16. The forces required to produce a pressure drop, however, are comparatively low, which permits the achievement of very low net actuating times.

Please replace paragraph [0034] with the following amended paragraph:

[0034] In the embodiment form of the injection nozzle 1 according to Fig. 2, the first compensator surface 16 is embodied on a compensator piston 32, which is guided in the nozzle body 2 so that it is able to execute a stroke in a compensator piston guide 33 and is drive-coupled to the nozzle needle 5. Preferably, the compensator piston 32 is attached to the nozzle needle 5 and in particular, can be integrated into it or of one piece with it. Likewise, **it** is basically also possible for the nozzle needle 5 and compensator piston 32 to be placed against each other end to end, without being attached to each other. It is possible in this case for the prevailing pressure ratios to cause the nozzle needle 5 and compensator piston 32 to move together as a unit, continuously engaged by forces that press the two components together at their ends.

Page 13, please replace paragraph [0039] with the following amended paragraph:

[0039] In the initial state depicted in Fig. 2, the nozzle needle 5 is closed, i.e. the needle tip 7 rests against the needle seat 8, thus disconnecting the at least one injection opening 3 from the supply line [[5]] **9**. In the initial state, the inlet line 36 permits a pressure compensation between the supply line 9 and the first control chamber 23 so that the high fuel pressure essentially prevails in the first control chamber 23. The first hydraulic path 22 also connects the high fuel pressure to the first compensator surface 16. In addition, the high fuel pressure

is continuously present in the second compensator chamber 35 so that it also acts on the second compensator surface 34. The compensator surfaces 16, 34 and the pressure shoulder 12 are matched to one another so that in the initial state, a resulting force acting in the ~~opening~~ **closing** direction 17 is exerted on the nozzle needle 5 or on the unit comprised of the compensator piston 32 and nozzle needle 5. This presses the needle tip 7 of the nozzle needle 5 against the sealing seat 8. The return spring 26 also acts in the closing direction and exerts an additional closing force on the nozzle needle 5.

Page 20, please replace paragraph [0058] with the following amended paragraph:

[0058] As in the embodiment form according to Fig. 1, the second hydraulic path 29 can once again be embodied by means of a control piston bypass 30 situated between the control piston 18 and the control piston guide 20 and in this case, connects the annular groove 45 so that it communicates with the conversion chamber 43. In addition or alternatively, it is also possible to provide a compensator piston bypass 47 situated radially between the compensator piston 32 and the compensator piston guide 33, connecting the second compensator chamber 35 so that it communicates with the conversion chamber 43. The control piston bypass 30 and the compensator piston **bypass** 47 are each embodied as throttled so that only in quasi-static states does a pressure compensation occur between the conversion chamber 43 on one hand and the second compensator chamber 35 and/or the annular groove 45 on the other, whereas in dynamic states, the respective bypass 30, 47 is essentially closed.

Page 21, please replace paragraph [0060] with the following amended paragraph:

[0060] The injection nozzle 1 also has a second leakage chamber 51 that is likewise connected to the leakage line 50 and is situated in the nozzle body 2, at the end of the control piston 18 oriented away from the conversion chamber 43. Leakages ~~the~~ **that** travel along the control piston 18 from the annular groove 45 into the second leakage chamber 51 can thus be drained away without danger to the actuator 19.

Page 22, please replace paragraph [0062] with the following amended paragraph:

[0062] In the initial position depicted in Fig. 4, the nozzle needle 5 is closed, i.e. its needle tip 7 rests against the sealing seat 8, thus disconnecting the at least one injection opening 3 from the supply line 9. In this initial state, the high fuel pressure acts on the pressure shoulder 12. The high fuel pressure is also present in the second compensator chamber [[25]] **35**. The second hydraulic path 29, i.e. the control piston bypass 30 and/or the compensator piston bypass 47 also conveys the high fuel pressure into the conversion chamber 43. In the initial state, the balance of forces acting on the unit comprised of the compensator piston 32, the nozzle needle 5, and the piston rod 48 yields a resulting force acting in the closing direction 17. The nozzle needle 5 is thus pressed into its sealing seat 8 with a corresponding closing force.

Page 23, please replace paragraph [0064] with the following amended paragraph:

[0064] In order to terminate the injection process, the actuator 19 is triggered to reset the control piston 18, causing it to pull back out of the conversion chamber 43. As a result, the

pressure in the conversion chamber 43 drops rapidly. Here, too, the dynamics of the pressure drop prevent a pressure compensation from occurring via the throttled second hydraulic path [[29]] **30, 47** so that the pressure drop impinges on the first compensator surface 16 directly. As a result, the balance of forces acting on the unit including the nozzle needle 5 changes again so that the resulting force now acts in the closing direction 17 once more. The nozzle needle 5 then travels back into its sealing seat 8 and closes the at least one injection opening 3. This embodiment form also permits a direct triggering of the nozzle needle 5; the expense required to achieve this is kept relatively low.

Page 26, please add the following new paragraph after paragraph [0073]:

[0074] The foregoing relates to preferred exemplary embodiments of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.

Please delete pages 35, 36 and 37.